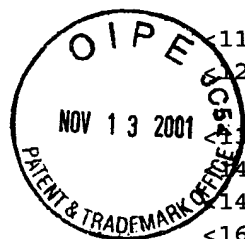


SEQUENCE LISTING



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 <120> Functional Hybrid Polypeptide with Collagen-binding Activity  
 <130> 19990120  
 <140> WO, PCT/JP00/00964  
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 <222> (2)..(341)  
 <223> /note="human fibronectin collagen-binding domain"  
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 35 40 45  
 Asn Gly Val Ser Cys Gln Glu Thr Ala Val Thr Gln Thr Tyr Gly Gly  
 50 55 60  
 Asn Ser Asn Gly Glu Pro Cys Val Leu Pro Phe Thr Tyr Asn Gly Arg  
 65 70 75 80  
 Thr Phe Tyr Ser Cys Thr Thr Glu Gly Arg Gln Asp Gly His Leu Trp  
 85 90 95  
 Cys Ser Thr Thr Ser Asn Tyr Glu Gln Asp Gln Lys Tyr Ser Phe Cys  
 100 105 110  
 Thr Asp His Thr Val Leu Val Gln Thr Arg Gly Gly Asn Ser Asn Gly  
 115 120 125  
 Ala Leu Cys His Phe Pro Phe Leu Tyr Asn Asn His Asn Tyr Thr Asp  
 130 135 140  
 Cys Thr Ser Glu Gly Arg Arg Asp Asn Met Lys Trp Cys Gly Thr Thr  
 145 150 155 160  
 Gln Asn Tyr Asp Ala Asp Gln Lys Phe Gly Phe Cys Pro Met Ala Ala  
 165 170 175

His	Glu	Glu	Ile	Cys	Thr	Thr	Asn	Glu	Gly	Val	Met	Tyr	Arg	Ile	Gly
			180					185					190		
Asp	Gln	Trp	Asp	Lys	Gln	His	Asp	Met	Gly	His	Met	Met	Arg	Cys	Thr
		195					200					205			
Cys	Val	Gly	Asn	Gly	Arg	Gly	Glu	Trp	Thr	Cys	Ile	Ala	Tyr	Ser	Gln
	210					215					220				
Leu	Arg	Asp	Gln	Cys	Ile	Val	Asp	Asp	Ile	Thr	Tyr	Asn	Val	Asn	Asp
225					230					235					240
Thr	Phe	His	Lys	Arg	His	Glu	Glu	Gly	His	Met	Leu	Asn	Cys	Thr	Cys
			245						250					255	
Phe	Gly	Gln	Gly	Arg	Gly	Arg	Trp	Lys	Cys	Asp	Pro	Val	Asp	Gln	Cys
			260					265					270		
Gln	Asp	Ser	Glu	Thr	Gly	Thr	Phe	Tyr	Gln	Ile	Gly	Asp	Ser	Trp	Glu
	275						280					285			
Lys	Tyr	Val	His	Gly	Val	Arg	Tyr	Gln	Cys	Tyr	Cys	Tyr	Gly	Arg	Gly
	290					295					300				
Ile	Gly	Glu	Trp	His	Cys	Gln	Pro	Leu	Gln	Thr	Tyr	Pro	Ser	Ser	Ser
305					310					315					320
Gly	Pro	Val	Glu	Val	Phe	Ile	Thr	Glu	Thr	Pro	Ser	Gln	Pro	Asn	Ser
			325					330						335	
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			340												

<210> 2

<211> 159

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Human Basic  
Fibroblast Growth Factor with Enterokinase  
Recognition Sequence

<220>

<221> PEPTIDE

<222> (1)..(5)

<223> /note="enterokinase recognition sequence"

<220>

<221> PEPTIDE

<222> (6)..(159)

<223> /note="human fibroblast growth factor"

<400> 2

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Pro	Glu	Asp	Gly	Gly	Ser	Gly	Ala	Phe	Pro	Pro	Gly	His	Phe	Lys	Asp
	20						25					30			
Pro	Lys	Arg	Leu	Tyr	Cys	Lys	Asn	Gly	Gly	Phe	Phe	Leu	Arg	Ile	His
	35					40						45			
Pro	Asp	Gly	Arg	Val	Asp	Gly	Val	Arg	Glu	Lys	Ser	Asp	Pro	His	Ile
	50					55					60				
Lys	Leu	Gln	Leu	Gln	Ala	Glu	Glu	Arg	Gly	Val	Val	Ser	Ile	Lys	Gly
65					70					75					80
Val	Cys	Ala	Asn	Arg	Tyr	Leu	Ala	Met	Lys	Glu	Asp	Gly	Arg	Leu	Leu
			85					90						95	
Ala	Ser	Lys	Cys	Val	Thr	Asp	Glu	Cys	Phe	Phe	Phe	Glu	Arg	Leu	Glu
			100					105						110	

Ser Asn Asn Tyr Asn Thr Tyr Arg Ser Arg Lys Tyr Thr Ser Trp Tyr  
115 120 125  
Val Ala Leu Lys Arg Thr Gly Gln Tyr Lys Leu Gly Ser Lys Thr Gly  
130 135 140  
Pro Gly Gln Lys Ala Ile Leu Phe Leu Pro Met Ser Ala Lys Ser  
145 150 155

<210> 3

<211> 58

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Human Epidermal  
Growth Factor with Enterokinase Recognition  
Sequence

<220>

<221> PEPTIDE

<222> (1)..(5)

<223> /note="enterokinase recognition sequence"

<220>

<221> PEPTIDE

<222> (6)..(58)

<223> /note="human epidermal growth factor"

<400> 3

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20 25 30  
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35 40 45  
Tyr Arg Asp Leu Lys Trp Trp Glu Leu Arg  
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<210> 4

<211> 501

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Hybrid  
Polypeptide of Human Fibronectin Collagen-Binding  
Domain and Human Basic Fibroblast Growth Factor

<220>

<221> INIT \_MET

<222> (1)

<220>

<221> DOMAIN

<222> (2)..(341)

<223> /note="human fibronectin collagen-binding domain"

<220>

<221> PEPTIDE

<222> (343)..(347)

<223> /note="enterokinase recognition sequence"

<220>

<221> PEPTIDE

<222> (348)..(501)

<223> /note="human fibroblast growth factor"

<400> 4

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Gly	His	Cys	Val	Thr	Asp	Ser	Gly	Val	Val	Tyr	Ser	Val	Gly	Met	Gln
			20					25					30		
Trp	Leu	Lys	Thr	Gln	Gly	Asn	Lys	Gln	Met	Leu	Cys	Thr	Cys	Leu	Gly
		35					40					45			
Asn	Gly	Val	Ser	Cys	Gln	Glu	Thr	Ala	Val	Thr	Gln	Thr	Tyr	Gly	Gly
	50					55					60				
Asn	Ser	Asn	Gly	Glu	Pro	Cys	Val	Leu	Pro	Phe	Thr	Tyr	Asn	Gly	Arg
65					70					75					80
Thr	Phe	Tyr	Ser	Cys	Thr	Thr	Glu	Gly	Arg	Gln	Asp	Gly	His	Leu	Trp
				85					90					95	
Cys	Ser	Thr	Thr	Ser	Asn	Tyr	Glu	Gln	Asp	Gln	Lys	Tyr	Ser	Phe	Cys
			100					105					110		
Thr	Asp	His	Thr	Val	Leu	Val	Gln	Thr	Arg	Gly	Gly	Asn	Ser	Asn	Gly
		115					120					125			
Ala	Leu	Cys	His	Phe	Pro	Phe	Leu	Tyr	Asn	Asn	His	Asn	Tyr	Thr	Asp
	130					135					140				
Cys	Thr	Ser	Glu	Gly	Arg	Arg	Asp	Asn	Met	Lys	Trp	Cys	Gly	Thr	Thr
145					150					155					160
Gln	Asn	Tyr	Asp	Ala	Asp	Gln	Lys	Phe	Gly	Phe	Cys	Pro	Met	Ala	Ala
				165					170					175	
His	Glu	Glu	Ile	Cys	Thr	Thr	Asn	Glu	Gly	Val	Met	Tyr	Arg	Ile	Gly
			180					185					190		
Asp	Gln	Trp	Asp	Lys	Gln	His	Asp	Met	Gly	His	Met	Met	Arg	Cys	Thr
		195					200					205			
Cys	Val	Gly	Asn	Gly	Arg	Gly	Glu	Trp	Thr	Cys	Ile	Ala	Tyr	Ser	Gln
	210					215					220				
Leu	Arg	Asp	Gln	Cys	Ile	Val	Asp	Asp	Ile	Thr	Tyr	Asn	Val	Asn	Asp
225					230					235					240
Thr	Phe	His	Lys	Arg	His	Glu	Glu	Gly	His	Met	Leu	Asn	Cys	Thr	Cys
				245					250					255	
Phe	Gly	Gln	Gly	Arg	Gly	Arg	Trp	Lys	Cys	Asp	Pro	Val	Asp	Gln	Cys
			260					265					270		
Gln	Asp	Ser	Glu	Thr	Gly	Thr	Phe	Tyr	Gln	Ile	Gly	Asp	Ser	Trp	Glu
		275					280					285			
Lys	Tyr	Val	His	Gly	Val	Arg	Tyr	Gln	Cys	Tyr	Cys	Tyr	Gly	Arg	Gly
	290					295					300				
Ile	Gly	Glu	Trp	His	Cys	Gln	Pro	Leu	Gln	Thr	Tyr	Pro	Ser	Ser	Ser
305					310					315					320
Gly	Pro	Val	Glu	Val	Phe	Ile	Thr	Glu	Thr	Pro	Ser	Gln	Pro	Asn	Ser
				325					330					335	
His	Pro	Ile	Gln	Trp	Leu	Asp	Asp	Asp	Asp	Lys	Ala	Ala	Gly	Ser	Ile
			340					345					350		
Thr	Thr	Leu	Pro	Ala	Leu	Pro	Glu	Asp	Gly	Gly	Ser	Gly	Ala	Phe	Pro
		355					360					365			
Pro	Gly	His	Phe	Lys	Asp	Pro	Lys	Arg	Leu	Tyr	Cys	Lys	Asn	Gly	Gly
	370					375					380				
Phe	Phe	Leu	Arg	Ile	His	Pro	Asp	Gly	Arg	Val	Asp	Gly	Val	Arg	Glu
385					390					395					400
Lys	Ser	Asp	Pro	His	Ile	Lys	Leu	Gln	Leu	Gln	Ala	Glu	Glu	Arg	Gly

				405					410					415			
Val	Val	Ser	Ile	Lys	Gly	Val	Cys	Ala	Asn	Arg	Tyr	Leu	Ala	Met	Lys		
			420					425					430				
Glu	Asp	Gly	Arg	Leu	Leu	Ala	Ser	Lys	Cys	Val	Thr	Asp	Glu	Cys	Phe		
		435					440					445					
Phe	Phe	Glu	Arg	Leu	Glu	Ser	Asn	Asn	Tyr	Asn	Thr	Tyr	Arg	Ser	Arg		
	450					455					460						
Lys	Tyr	Thr	Ser	Trp	Tyr	Val	Ala	Leu	Lys	Arg	Thr	Gly	Gln	Tyr	Lys		
465					470					475					480		
Leu	Gly	Ser	Lys	Thr	Gly	Pro	Gly	Gln	Lys	Ala	Ile	Leu	Phe	Leu	Pro		
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<210> 5

<211> 400

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Hybrid  
Polypeptide of Human Fibronectin Collagen-Binding  
Domain and Human Epidermal Growth Factor

<220>

<221> INIT \_MET

<222> (1)

<220>

<221> DOMAIN

<222> (2)..(341)

<223> /note="human fibronectin collagen-binding domain"

<220>

<221> PEPTIDE

<222> (343)..(347)

<223> /note=" enterokinase recognition sequence"

<220>

<221> PEPTIDE

<222> (348)..(400)

<223> /note="human epidermal growth factor"

<400> 5

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Gly	His	Cys	Val	Thr	Asp	Ser	Gly	Val	Val	Tyr	Ser	Val	Gly	Met	Gln		
			20				25						30				
Trp	Leu	Lys	Thr	Gln	Gly	Asn	Lys	Gln	Met	Leu	Cys	Thr	Cys	Leu	Gly		
		35				40					45						
Asn	Gly	Val	Ser	Cys	Gln	Glu	Thr	Ala	Val	Thr	Gln	Thr	Tyr	Gly	Gly		
	50				55					60							
Asn	Ser	Asn	Gly	Glu	Pro	Cys	Val	Leu	Pro	Phe	Thr	Tyr	Asn	Gly	Arg		
65				70						75					80		
Thr	Phe	Tyr	Ser	Cys	Thr	Thr	Glu	Gly	Arg	Gln	Asp	Gly	His	Leu	Trp		
			85				90						95				
Cys	Ser	Thr	Thr	Ser	Asn	Tyr	Glu	Gln	Asp	Gln	Lys	Tyr	Ser	Phe	Cys		
			100				105					110					
Thr	Asp	His	Thr	Val	Leu	Val	Gln	Thr	Arg	Gly	Gly	Asn	Ser	Asn	Gly		
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 <210> 8  
 <211> 1053  
 <212> DNA  
 <213> Artificial Sequence  
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 Fibronectin Collagen-Binding Domain  
 <220>  
 <221> conflict  
 <222> (109)  
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 <221> conflict  
 <222> (206)  
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 <222> (270)  
 <220>  
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 <222> (374)  
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 <222> (681)  
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 acacaaggaa ataagcaaata gctttgcacg tgcctgggca acggagtcag ctgccaagag 180  
 acagctgtaa cccagactta cgggtggcaac tcaaattggag agccatgtgt cttaccattc 240  
 acctacaatg gcaggacgtt ctactcctgc accagaaaag ggcgacagga cggacatctt 300  
 tgggtgcagca caacttcgaa ttatgagcag gaccagaaat actctttctg cacagaccac 360  
 actgttttgg ttcagactcg aggaggaaat tccaatgggtg ccttgtgcca cttccccttc 420  
 ctatacaaca accacaatta cactgattgc acttctgagg gcagaagaga caacatgaag 480  
 tgggtgtggga ccacacagaa ctatgatgcc gaccagaagt ttgggttctg ccccatgggt 540  
 gccacagagg aaatctgcac aaccaatgaa ggggtcatgt accgcattgg agatcagtgg 600  
 gataagcagc atgacatggg tcacatgatg aggtgcacgt gtgttgggaa tggtcgtggg 660  
 gaatggacat gcattgccta ctgcagctt cgagatcagt gcattgttga tgacatcact 720  
 tacaatgtga acgacacatt ccacaagcgt catgaagagg ggcacatgct gaactgtaca 780  
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 gagactggga cgttttatca aattggagat tcatgggaga agtatgtgca tgggtgtcaga 900  
 taccagtgtc actgctatgg ccgtggcatt ggggagtggc attgccaacc ttacagacc 960  
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 tcccacccca tccagtgggt cgagtaagga tcc 1053  
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 <211> 40  
 <212> DNA  
 <213> Artificial Sequence  
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 <223> Description of Artificial Sequence:PCR Sense  
 Primer for Human Basic Fibroblast Growth Factor  
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 <210> 10

<211> 31  
 <212> DNA  
 <213> Artificial Sequence  
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 <223> Description of Artificial Sequence:PCR Antisense  
 Primer for Human Basic Fibroblast Growth Factor  
 <400> 10  
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 <210> 11  
 <211> 489  
 <212> DNA  
 <213> Artificial Sequence  
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 <223> Description of Artificial Sequence:Human Basic  
 Fibroblast Growth Factor with Enterokinase  
 Recognition Sequence  
 <220>  
 <221> mutation  
 <222> (228)  
 <223> /note="mutation caused by polymerase chain  
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 aacggggggct tcttcctgcg catccacccc gacggccgag ttgacgggggt ccgggagaag 180  
 agcgaccctc acatcaagct acaacttcaa gcagaagaga gaggagtcgt gtctatcaaa 240  
 ggagtgtgtg ctaaccgtta cctggctatg aaggaagatg gaagattact ggcttctaaa 300  
 tgtgttacgg atgagtgttt cttttttgaa cgattggaat ctaataacta caatacttac 360  
 cggtaagga aatacaccag ttggtatgtg gcactgaaac gaactgggca gtataaactt 420  
 ggatccaaaa caggacctgg gcagaaagct atactttttc ttccaatgtc tgctaagagc 480  
 tgagaattc 489  
 <210> 12  
 <211> 44  
 <212> DNA  
 <213> Artificial Sequence  
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 <223> Description of Artificial Sequence:PCR Sense  
 Primer for Human Epidermal Growth Factor  
 <400> 12  
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 <210> 13  
 <211> 30  
 <212> DNA  
 <213> Artificial Sequence  
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 <223> Description of Artificial Sequence:PCR Antisense  
 Primer for Human Epidermal Growth Factor  
 <400> 13  
 gaattcttag cgcagttccc accacttcag 30  
 <210> 14  
 <211> 186  
 <212> DNA  
 <213> Artificial Sequence



<220>

<223> Description of Artificial Sequence:Human Epidermal  
Growth Factor with Enterokinase Recognition  
Sequence

<400> 14

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ctccatgatg gtgtgtgcat gtatatgaa gcattggaca agtatgcatg caactgtgtt 120
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gaattc                                           186
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<210> 15

<211> 1527

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Hybrid  
Polypeptide of Human Fibronectin Collagen-Binding  
Domain and Human Fibroblast Growth Factor

<400> 15

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acacaaggaa ataagcaaat gctttgcacg tgcctgggca acggagtcag ctgccaagag 180
acagctgtaa cccagactta cgggtggcaac tcaaattggag agccatgtgt cttaccattc 240
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tgggtgcagca caacttcgaa ttatgagcag gaccagaaat actctttctg cacagaccac 360
actgttttgg ttcagactcg aggaggaaat tccaatgggt ccttgtgcca cttccccttc 420
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tgggtgtggga ccacacagaa ctatgatgcc gaccagaagt ttgggttctg ccccatggct 540
gccacgagg aaatctgcac aaccaatgaa ggggtcatgt accgcattgg agatcagtgg 600
gataagcagc atgacatggg tcacatgatg aggtgcacgt gtgttgggaa tggtcgtggg 660
gaatggacat gcattgccta ctgcagctt cgagatcagt gcattgttga tgacatcact 720
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tgcttcggtc agggtcgggg caggtggaag tgtgatcccc tcgaccaatg ccaggattca 840
gagactggga cgttttatca aattggagat tcatgggaga agtatgtgca tgggtgtcaga 900
taccagtgtc actgctatgg ccgtggcatt ggggagtggc attgccaacc tttacagacc 960
tatccaagct caagtgggtc tgtcgaagta tttatcactg agactccgag tcagcccaac 1020
tcccacccca tccagtggct cgacgacgat gataaggcag ccgggagcat caccacgtg 1080
cccgcttgc cggagatgg cggcagcggc gccttccgc ccggccactt caaggacccc 1140
aagcggctgt actgcaaaaa cgggggcttc ttctgcgca tccacccga cggccgagtt 1200
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ggagtcgtgt ctatcaaagg agtgtgtgct aaccgttacc tggctatgaa ggaagatgga 1320
agattactgg cttctaaatg tgttacggat gagtgtttct tttttgaacg attggaatct 1380
aataactaca atacttaccg gtcaaggaaa tacaccagtt ggtatgtggc actgaaacga 1440
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ccaatgtctg ctaagagctg agaattc                                           1527
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<210> 16

<211> 1224

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Hybrid  
Polypeptide of Human Fibronectin Collagen-Binding  
Domain and Human Epidermal growth factor

<400> 16

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acacaaggaa	ataagcaa	gctttgcacg	tgcttgggca	acggagtcag	ctgccaagag	180
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acctacaatg	gcaggacgtt	ctactcctgc	accacagaag	ggcgacagga	cggacatctt	300
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actgttttgg	ttcagactcg	aggaggaa	tccaatgg	ccttgtgcc	cttccccttc	420
ctatacaaca	accacaatta	cactgattgc	acttctgagg	gcagaagaga	caacatgaag	480
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gccacgagg	aaatctgcac	aaccaatgaa	ggggtcatgt	accgcattgg	agatcagtgg	600
gataagcagc	atgacatggg	tcacatgatg	aggtgcacgt	gtgttgggaa	tggtcgtggg	660
gaatggacat	gcattgccta	ctcgcagctt	cgagatcagt	gcattgttga	tgacatcact	720
tacaatgtga	acgacacatt	ccacaagcgt	catgaagagg	ggcacatgct	gaactgtaca	780
tgcttcggtc	agggtcgggg	caggtggaag	tgtgatcccg	tcgaccaatg	ccaggattca	840
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taccagtgc	actgctatgg	ccgtggcatt	ggggagtggc	attgccaacc	tttacagacc	960
tatccaagct	caagtgggcc	tgtcgaagta	tttatcactg	agactccgag	tcagcccaac	1020
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